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Selected US specifications from IPC sub-class

B60P

(54) **Vehicle lift**

(57) A vehicle lift apparatus which attaches to the underside of a vehicle loading deck (2) in proximity to the loading access opening (10) of the vehicle comprises longitudinal guide means (4) along which moves a carriage (5) from a stowed position to an outer position in which the ramp (9) of the lift apparatus may be moved between a lowered, ground position, an intermediate, pre-stowage position and a raised position in which the ramp is level with the deck (2). The ramp may be in two or more foldable parts (9a, b) to minimise stowage space and the movement required to store the ramp beneath the vehicle.

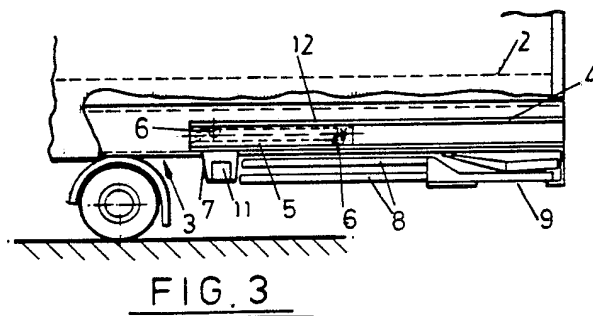
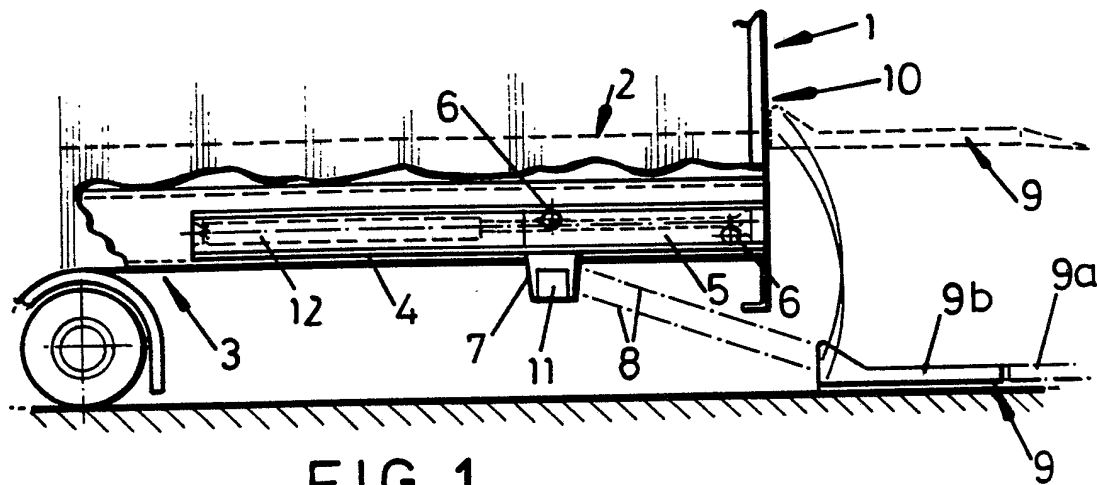
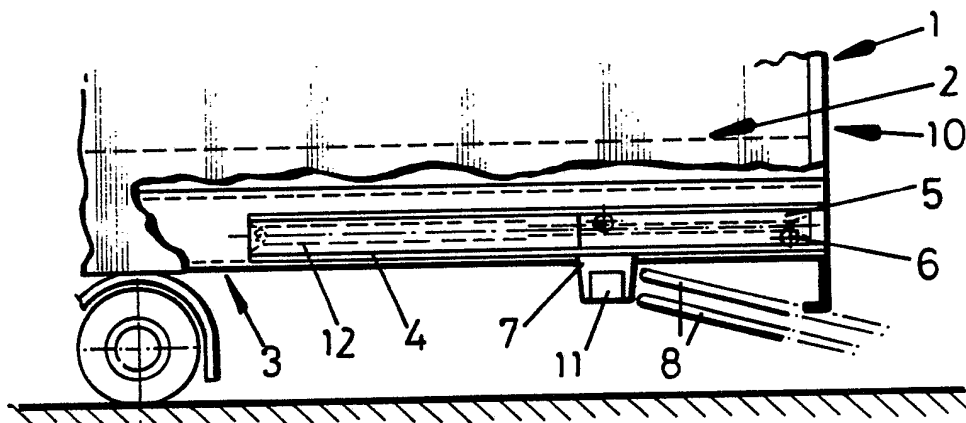
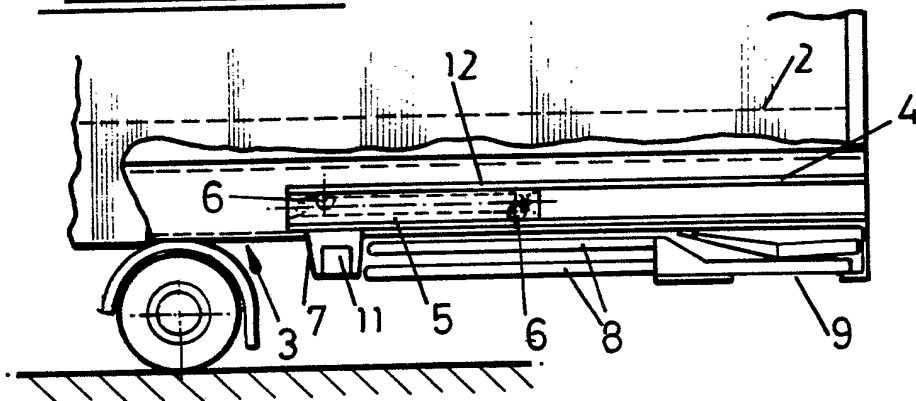
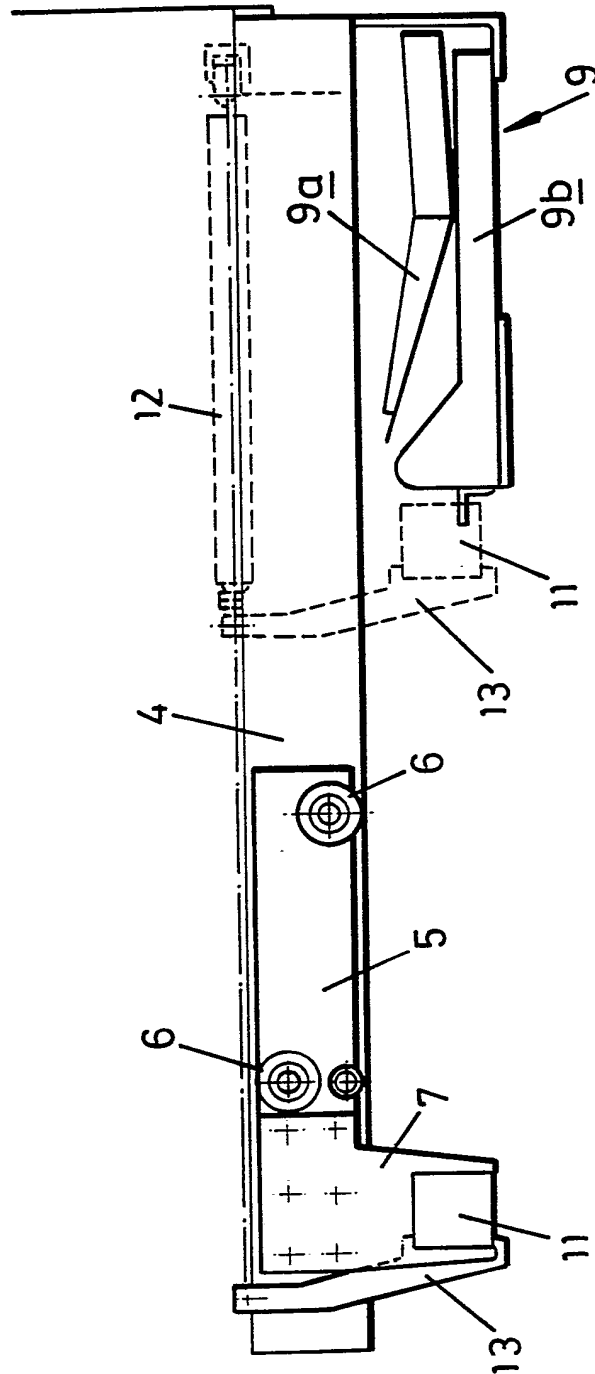


FIG. 3

FIG. 1FIG. 2FIG. 3



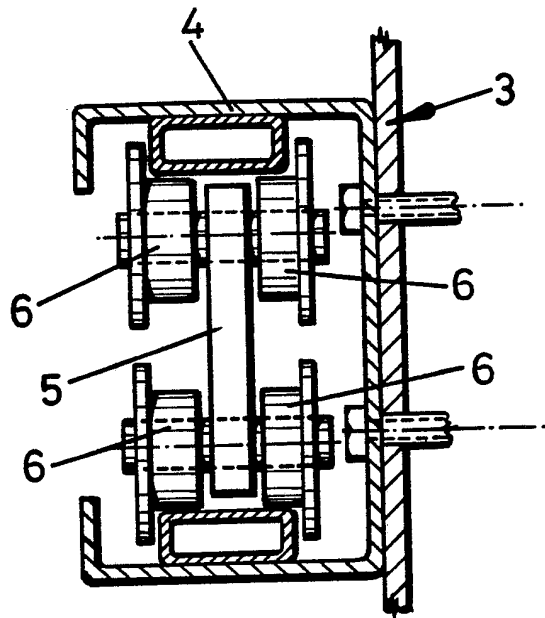


FIG. 5

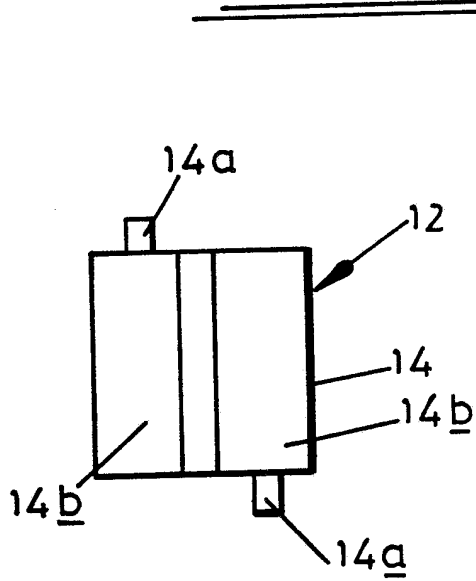


FIG. 6A

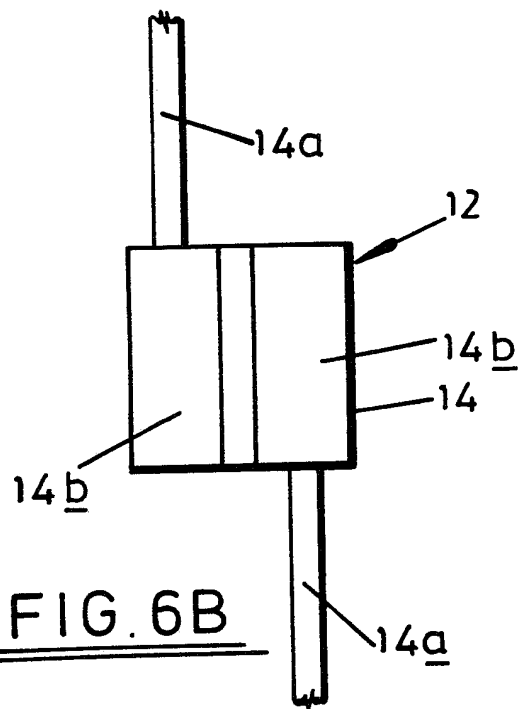


FIG. 6B

VEHICLE LIFT

The present invention relates to vehicle lifts and in particular to cantilever type lifts suitable for attachment to the rear or side of a vehicle for use in loading and unloading of the vehicle.

Previously known cantilever lifts are generally swung upwardly against the rear of the vehicle across the opening thereat and project to a greater or lesser extent from the vehicle thereby preventing a close approach of the vehicle to a loading bay platform.

It is an object of the present invention to avoid or minimize one or more of the above disadvantages.

The present invention provides a vehicle lift apparatus for attachment at the underside of a vehicle loading deck in proximity to an access opening, said apparatus comprising guide means extending longitudinally with respect to said deck; movable carriage means capable of displacement along said guide means; a ramp connected to said carriage means, said ramp being adapted in use of the apparatus to be movable between a lowered position on the ground adjacent the vehicle, an intermediate position in which it can be retracted into a storage position beneath the loading deck, and a raised position adjacent the load deck, whilst remaining generally parallel to said load deck.

Conveniently the carriage means is connected to the ramp through the intermediary of a parallelogram linkage

arrangement. Desirably also the ramp is at least partly foldable so as to reduce its dimensions in the direction in which the guide means extend thereby to reduce the extent to which the ramp support requires to be retracted so that the ramp in its storage position does not project beyond the rear end of the loading deck in the fully stowed condition of the apparatus.

The lift apparatus of the present invention is of a particularly simple and economic construction and is highly compact in its fully stowed position being retractable behind the end of the vehicle and at the same time occupying only a shallow depth below the load deck of the vehicle.

Various suitable reciprocable and/or pivotal displacement means may be used in accordance with the present invention for extending or retracting the ramp from or to its stowed position. Conveniently, pressurized fluid-operated piston and cylinder means are used especially those which are hydraulically operated, preferably electro-hydraulically operated.

An embodiment of the present invention will now be described, by way of example, with reference to the accompanying drawings. It will be understood that the description is given by way of example only and not by way of limitation.

In the drawings:

Fig. 1 is a generally schematic side view of a tail lift of the invention mounted on the rear of a goods vehicle with the ramp in its fully deployed condition;

Figs. 2 and 3 are corresponding views showing the ramp partly folded for stowing, and with the tail lift fully stowed respectively;

Fig. 4 is a side view to an enlarged scale of the ramp stowage mechanism.

Fig. 5 is a cross-sectional view to an enlarged scale illustrating the mounting of a carriage which is movable to effect extension and retraction of the ramp relative to the vehicle, and

Figs. 6A and 6B illustrate diagrammatically a piston and cylinder arrangement for use in extension and retraction of the ramp.

Referring to the drawings there is shown a vehicle 1 having a load deck 2 mounted on a vehicle chassis 3. Secured to each side of the chassis 3 is a horizontally extending guide beam 4 which acts as a guide for a carriage 5 provided with rollers 6 (as shown best in Fig. 5). The carriage 5 is able to move freely along the guide formed by the beam 4. Carried by the carriage 5 is a depending bracket 7, which is connected to the beam 11 and then through a parallel linkage mechanism 8 (Figs. 1 to 3) to a ramp 9. The ramp 9 is pivoted at its middle portion to enable an outer portion 9a of the ramp to be folded to overlies an inner portion 9b when in an out-of-use condition (as illustrated in Fig. 4).

It will be appreciated that whilst a two-part ramp is illustrated a three-part ramp may be envisaged.

The ramp 9 can be raised from ground level as shown in

Fig. 1 to a raised position adjacent a rear access opening 10 in the tail end of the vehicle 1, such raised position being shown in dotted lines in Fig. 1. The raising and lowering operations are controlled by means of a piston and cylinder device (not shown) which is carried by a main beam 11 extending transversely between the depending brackets 7 of each carriage 5. The raising and lowering piston and cylinder device effects upward and downward movement of the ramp 9 in a constant horizontal disposition through a mechanical linkage or lever system (not shown).

As shown best in Fig. 4, extension and retraction of the ramp 9 from and towards the guide beams 4 is effected by means of a second hydraulically-operated piston and cylinder device 12. The piston and cylinder device 12 is carried by a bracket 13 which is welded to the main beam 11.

The piston and cylinder device 12 is of a construction as shown in Figs. 6A and 6B and incorporates a double barrelled cylinder 14, and a piston 14a is associated with each barrel 14b of the cylinder 14, one of the pistons 14a projecting in a forward direction and the other projecting in a rearward direction. By means of this arrangement the effective space utilized by the piston and cylinder device is reduced as compared with a piston and cylinder device of equivalent overall extension and incorporating a single piston operable in only a single direction.

It will be readily appreciated that the lift device of the present invention is particularly compact in both its

longitudinal extent and its depth when in its fully stowed condition. When the ramp is raised to an intermediate position, it can be fully retracted under the vehicle load deck 2 by retracting the carriage 5 along the guide beams 4 a lesser distance than would otherwise have been necessary had the ramp not been foldable. Moreover, the construction is relatively simple and economic in nature and particularly simple and easy to operate.

CLAIMS:

1. A vehicle lift apparatus for attachment at the underside of a vehicle loading deck in proximity to an access opening, said apparatus comprising guide means extending longitudinally with respect to said deck; movable carriage means capable of displacement along said guide means; a ramp connected to said carriage means, said ramp being adapted in use of the apparatus to be movable between a lowered position on the ground adjacent the vehicle, an intermediate position in which it can be retracted into a storage position beneath the loading deck, and a raised position adjacent the load deck, whilst remaining generally parallel to said load deck.
2. Apparatus as claimed in claim 1, wherein the carriage means is connected to the ramp through a parallel linkage arrangement.
3. Apparatus as claimed in either one of claims 1 and 2 wherein the ramp is foldable so as to reduce its longitudinal dimensions with respect to the guide rails.
4. Apparatus as claimed in claim 3, wherein the ramp comprises at least two ramp portions arranged for relative pivotal movement about a transverse axis so that one of said portions overlies the other(s).
5. Apparatus as claimed in any one of the preceding claims, wherein the means for retracting said ramp into said storage position when in its intermediate position, comprises a piston and cylinder arrangement.

6. Apparatus as claimed in claim 5 wherein the piston and cylinder arrangement is a double acting arrangement.

7. Apparatus as claimed in claim 5, wherein the piston and cylinder arrangement comprises two cylinders arranged side by side having piston rods projecting therefrom in opposed directions.

8. Apparatus as claimed in any one of claims 2 to 7, wherein there is provided bracket means depending from the carriage means and supporting a cross-member upon which said parallel linkage arrangement is mounted for movement of the ramp.

9. Apparatus as claimed in any one of the preceding claims in which the ramp is moved between its lowered, intermediate and raised positions by a piston and cylinder arrangement.

10. A vehicle lift apparatus constructed, arranged and adapted to operate substantially as hereinbefore described with reference to and as shown in the drawings.

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US-CL-CURRENT: 414/558

ABSTRACT:

CHG DATE=19990617 STATUS=O> A vehicle lift apparatus which attaches to the underside of a vehicle loading deck (2) in proximity to the

loading access opening (10) of the vehicle comprises longitudinal guide means (4) along which moves a carriage (5) from a stowed position to an outer position in which the ramp (9) of the lift apparatus may be moved between a lowered, ground position, an intermediate, pre-stowage position and a raised position in which the ramp is level with the deck (2). The ramp may be in two or more foldable parts (9a, b) to minimise stowage space and the movement required to store the ramp beneath the vehicle. 